Arbor and Wild Life Day

March 1952

BULLETIN TO THE SCHOOLS

VOLUME 38
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THE UNIVERSITY OF THE STATE OF NEW YORK

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The Arbor and Wild Life Day number of the BULLETIN is the only one devoted annually to natural history and conservation interests.

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COVER PICTURE: The Moccasin-Flower or Pink Lady's-slipper
Courtesy of New York State Department of Commerce.

THE UNIVERSITY OF THE STATE OF NEW YORK
BULLETIN TO THE SCHOOLS

Issued monthly during the school year by the State Education Department

CHARLES F. PROBES, *Editor* MILDRED HAND, *Assistant*

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Bulletin to the Schools

VOLUME 38 MARCH 1952 NUMBER 7

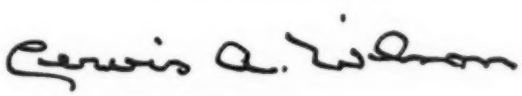
Arbor and Wild Life Day

For more than 75 years the schools of America have joined in observance of Arbor Day but to some schools the observance is still regarded merely as a pleasant signpost in the welcome to spring. The celebration is often a casual one featuring an assembly program or a tree-planting or the erection of a few birdhouses.

The observance of Arbor and Wild Life Day should be significant in emphasizing that our national survival depends in large measure on how wisely we understand and use our natural resources. The Conservation Department points out that already in this State more than 5,000,000 acres have been abandoned for the production of farm crops because the topsoil is gone and that scores of communities have been erased from the maps because the natural resources on which the economy of those communities once dependend have been used up. This waste of vital natural resources continues at an alarming rate, and since cities are dependent upon the country for survival, it is just as important for the urban pupil to realize this and learn some of the things that can be done about it as it is for the rural youngster.

I should like to urge that the observance of Arbor and Wild Life Day be carried out, whenever possible, by special programs emphasizing the practical and important aspects of conservation. At this time it is fitting to urge our young people to renewed efforts in defending from waste the natural resources of our beloved country — its soil and minerals, its forests, waters and wild life and its natural beauty.

Therefore, by virtue of my office as Commissioner of Education, and in accordance with the law, it is my duty and privilege to designate April 18th as Bird Day and April 25th, May 2d or May 9th, whichever best suits the convenience of each locality, as Arbor and Wild Life Day.



Lewis A. Wilson

Commissioner of Education

Out in the Field with Nature

Where Conservation Is the Keynote, Lessons Are Fun, and Good Citizens Are Trained

VIVIENNE ANDERSON
Associate in Secondary Curriculum
Bureau of Curriculum Development
State Education Department

IN WORD AND IN ACTION . . . These are the dual-approach interests of the State Education Department in the important field of conservation education.

The problems of many areas of the conservation field are expressed "in word" in the handbooks and syllabuses that serve as background guides to proposed content and activities for teacher-pupil use in classrooms of the State.

In the field of citizenship education, the state syllabus for seventh grade provides a major unit based on New York State's natural resources and its state-wide program of conservation. The ninth grade syllabus on world geography emphasizes problems of conservation in the United States and in many other parts of the world. Major units involving four to six weeks of concentrated work deal with the conservation of natural resources in the twelfth grade citizenship education syllabus.

The General Science Handbook, Part I, contains two complete units of work related to the conservation field. Two additional science handbooks now being prepared will present a wide variety of pupil activities based on the study of conservation problems.

At present the Bureau of Curriculum Development, Secondary, is preparing to produce a new publication in the conservation field in cooperation with the State Conservation Department. This booklet will present live accounts of practical school projects in conservation and a wide range of proposed conservation activities for elementary and secondary pupils.

The Secondary Curriculum Bureau's bimonthly publication, Schools in Action, presents a number of accounts of actual projects that are being undertaken in secondary schools throughout the State. Through the invitation of this publication, stories of excellent projects in the conservation field are being received by the Bureau from schools in every section of the State. The Bureau is keenly interested in learning about the techniques, the activities and the problems of groups working in this area of education.

This concern and the on-going contacts and follow-up of school activities emphasize the "action" phase of the Curriculum Bureau's interested relationship to the conservation field.

As a counterpart to the content and activities suggested in the syllabuses and handbooks, here are some examples of teacher-pupil projects that are currently translating courses of study into the live realm of worth-while classroom activity.

Sixty Acres of Forest Land . . .

When the boys and girls of Middlesex Valley School first studied the erosion problem on their school grounds, they discovered that the school had been built 12 years ago on a 99-acre farm, but only 22 acres had been utilized.

Gradually soil from the unused land washed down and erosion ditches carried away the solid ground that surrounded the building.

Senior high school pupils and their teachers decided to study the danger signals of the erosion problem and to join forces in preserving the school land.

Working with the county Soil Conservation District organization, a scale map of the area was drawn. It was decided that pupils would undertake the task of reforesting 60 acres of land.

Agricultural pupils and other senior high school pupils worked together in making the plans for planting the trees. They started to work on a small hill and gradually continued planting until seedlings and growing trees spread over 60 acres of land.

Every spring pupils plant seedlings which they get from the State Conservation Department. They carefully lay out the planting to provide open space for fire lanes and driveways. About 60,000 Norway spruce, red pine, Scotch pine, European larch, black locust and red cedar have dug their roots deep into the reforested land.

As the reforestation work progresses, pupils learn to identify the many species of trees and shrubs they handle. They learn the nature of the land that is best adapted to growing various kinds of trees. They practice the techniques involved in handling and planting young trees and they learn the nature of erosion and the value of reforestation as a means of controlling it.

Along with their forestry work they study the problem of wildlife conservation. Pupils made a study of shrubs that attract wild game, and around the borders of the land they planted long rows

Courtesy of Henry McDougal, Middlesex Valley Central School

Planting Seedlings for the 60 Acres of Forest Land at Middlesex Valley School

of shrubbery to provide food, cover and protection to rabbits and pheasants. Through this careful selection and planting of shrubs, a wild game refuge has been developed. But equally important, the whole woodland will be a sanctuary for all native wildlife.

As an outgrowth of the project, boys who are Future Farmers of America have planted about 20,000 trees on their home farms. Each of these Future Farmers may receive 1000 trees free from the State Conservation Department.

Within a few years, a part of the school forest will need thinning and pupils will start to harvest Christmas trees from the reforested area. Revenue from the sale of these trees will be used to develop a small community park for the use of children and adults.

In 40 to 60 years, when the trees reach a size for cutting cordwood or poles, they will provide an excellent source of revenue to the school.

As a result of the concentrated efforts of these high school pupils, their teachers and the cooperating State Conservation Department, a pressing erosion problem has been controlled, school property has been beautified, a wild game refuge has been developed and a keen interest in planting trees for use and beauty has been stimulated throughout the community.

On the Air; in the Ground ...

Eighth grade pupils at Cortland's Ella Van Hoesen Elementary School have made conservation problems the focal point of interest for their program of studies this year.

Field trips in the area surrounding the school provide firsthand opportunity for analyzing conservation problems as well as the techniques and methods that can be used in their solution. Pupils learn to measure the per cent of land slope. They demonstrate water run-off on land plowed up and down, plowed by contour and with cover crop. They lay out contour lines for plowing, learn how a forest floor absorbs water and how splash, wind and gully erosion take place.

The class also spends two weeks in a concentrated study of conservation problems at Raquette Lake Camp. During their last camping trip, pupils prepared a series of 35-millimeter slides to illustrate their outdoor activities. They are now preparing a tape recording to serve as narration for the slides and a booklet which will describe and illustrate their camp experiences.

Supervisor William Olcott stresses the attempts of the class to interpret conservation problems in terms of their effects on human relations. As an outgrowth of this emphasis, pupils are writing and producing a series of five broadcasts over the local radio station.

Two of the programs that have been broadcast were concerned with the plight of a family living on submarginal lands, and a campfire discussion of the implications of problems studied by pupils during a day at camp.

The class recommends the Cornell Rural School Leaflets and a number of tape recordings which are available from the Cornell Tape Recording Center as interesting and basic reference materials.

Sanctuary for Birds ...

Third grade pupils at Marlboro have an unusual "outdoor" classroom. A huge window extends the full length of the room, and because of this, the wide expanse of outdoor landscaping seems to blend into the interior of the room itself.

The pupils and their teacher, Catherine E. Dowd, are using this natural "laboratory" to conduct a study of birds.

Photograph by W. C. Coughlin
From Keene Valley Central School

Pupils Study Birds' Nest and Models of Birds' Eggs in Their Classroom Museum

Junior and senior high school pupils cooperated with the younger pupils by constructing birdhouses in their shop classes. These houses were perched on the leafy branches of a large oak tree that shades the third grade classroom.

The third graders constructed their own feeding stations. They built simple rectangular board shelves and suspended them from the branches of the oak tree.

Pupils take extra care in the school cafeteria to save all their leftover pieces of bread for use in the feeding stations in a special "bread box for the birds."

A birdbath was made by setting a round, shallow pan on a post and placing a flat stone in the center of the pan for the birds to alight on; pupils assume the responsibility of keeping the birdbath filled with fresh water. They can watch the birds drink and bathe through their classroom window.

Frequent hikes through the surrounding neighborhood familiarize pupils with the songs and the food habits and activities of the robin, the bluebird, the downy woodpecker and many others. Boys and girls learn to identify the various shrubs that bear the fruits eaten by birds during different seasons of the year. They have created a conservation museum in which they study birds' nests and models of birds' eggs.

Interest in the bird sanctuary plays a vital part in the art work, the discussions and the written expression of the class in this "through the looking glass" adventure inspired by an extra-big window!

Outdoor Conservation Laboratory ...

Pupils, teachers and the community at Norwich are concentrating their interest and energy on 53 acres of marginal land recently purchased by the Board of Education for pupil projects in the field of conservation. Classes in agriculture, citizenship education, various fields of science and art, and groups from the elementary schools, will utilize this piece of land for study and recreational purposes.

A system-wide conservation committee of pupils and teachers has already started to put into action plans for transforming the open-brush-grass land, the wooded area and the five acres of swampland into carefully planned and mapped trails, animal shelters, feeding stations, a fish pond, muskrat ponds and an area for school and community recreation.

Pupils have identified 200 plant specimens and 20 kinds of trees and shrubs. They are learning the techniques of forest cleanup and are beginning to erect lean-tos and shelters. They are planning to make their own maple syrup from the sap available in the maple trees.

Emphasis is being placed on developing an understanding of how to solve problems that are involved in the project. Pupils are interested in learning how to keep game birds alive during severe winters, how to protect and propagate fish and muskrat, how to prevent forest fires through forest cleanup and the establishment of fire lanes, how to identify poisonous plants and how to protect the balance of nature.

Along with their outdoor study, pupils will be gaining experience by utilizing many kinds of equipment, materials and scientific references.

Vail Sheldon and Lyman Anderson, agriculture and citizenship education teachers at Norwich, have been extremely active in developing interest in this project throughout the school system. Besides the wealth of current projects on which they are working, both teachers are looking forward to the later harvesting of Christmas trees that pupils will plant as seedlings.

More power to the words and the deeds!

Courtesy of Fredonia State Teachers College

Sketching the Outdoor Scene at Conservation Camp

This Is the State Forest Preserve

How It Came To Be, What It Is and Where It Is

BORDEN H. MILLS
Former President
Adirondack Mountain Club

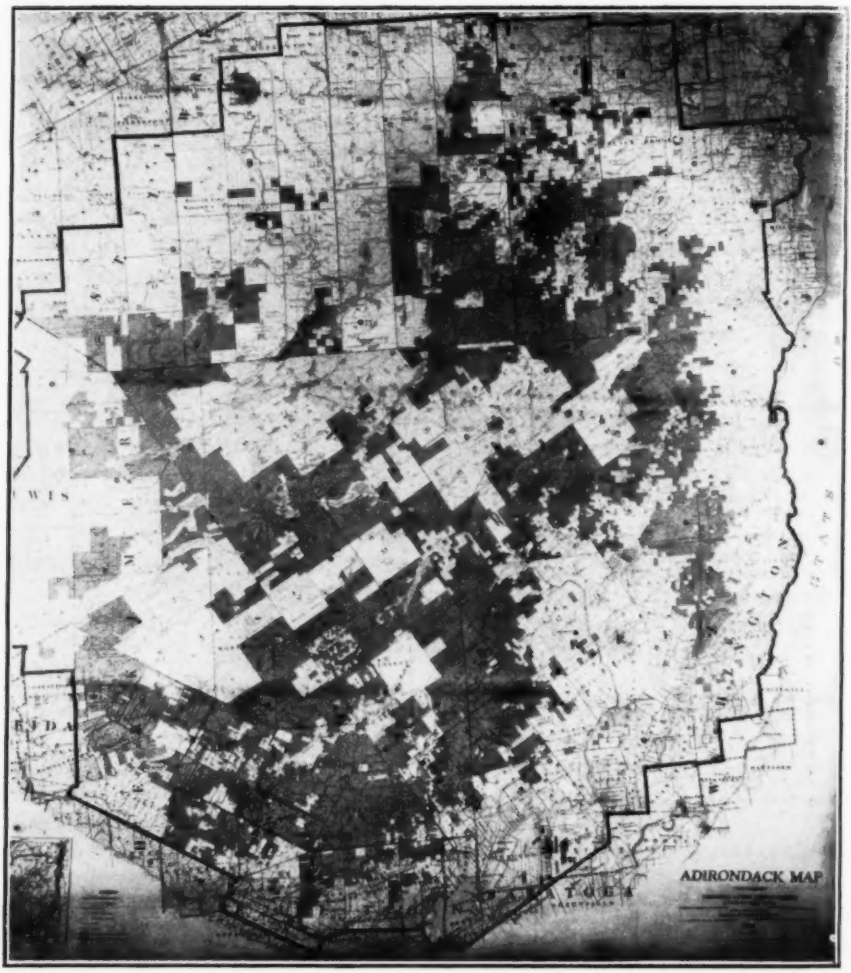
EVERY CITIZEN of the Empire State should know what our Forest Preserve is, how and why it was established and what a real asset it is to our State. Sad to relate, there exists a great deal of misunderstanding as to just what it comprises, even among members of the Legislature itself. This article is written in the hope that the youth in our schools — the citizens of tomorrow — may come to understand how it is constituted, and why its continuance, expansion and protection are essential to the well-being of our commonwealth.

Our State embraces a land and water area of nearly 50,000 square miles. Of this, 2,413,270 acres or about 3770 square miles, approximately one-thirteenth of the whole, are owned in common by the people of the State, in an area set aside as the State Forest Preserve. The Forest Preserve lands lie in two localities — the larger portion in the northern bulge toward Canada, including the Adirondack mountains, within the counties of St Lawrence, Franklin, Clinton, Lewis, Oneida, Hamilton, Herkimer, Fulton, Essex, Warren, Washington and Saratoga. The state-owned lands within their borders comprise about one-quarter of their total area. The smaller segment of the Forest Preserve holdings lies in the Catskill region of the east-central portion of the State, within the counties of Greene, Ulster, Sullivan and Delaware. Here about 365 square miles, approximately one-twelfth of the total, are state-owned.

The Preserve consists of thousands of parcels of land, large and small, intermixed with private holdings except in portions of the high peak area of both the Adirondacks and Catskills. As will be noted by an examination of the accompanying map of the Adirondack area, the division of holdings as between the public and private ownership, bears close resemblance to a complicated picture puzzle. The total extent of the Forest Preserve lands may be better realized by comparison: they equal three-fourths of the area of Connecticut and almost half that of either Massachusetts or New Jersey.

Now here arises a complication which creates the confusion in the public mind. There are two so-called "parks" in the State within the borders of which are large sections of Forest Preserve land, namely the Adirondack Park and the Catskill Park, which are often erroneously identified with the Preserve itself, although each of them contains great areas of private land. These two "parks" are each bounded by what has come to be known as the "Blue Line." This line, printed in blue, first appeared in 1890 on a map of the Adirondacks, showing the boundaries of the then proposed Adirondack Park. Two years later, when the park was created, the "Blue Line" began its long career as the State's way of marking the park boundary on its official maps.

All lands, now owned or hereafter acquired by the State within the two blocks of counties named above, with certain minor exceptions, are to be forever kept as wild forest lands under the protection of



Courtesy of New York State Conservation Department

Adirondack Park, Showing " Blue Line " Boundary, and the Included State Forest Preserve Lands (Shaded Areas) Comprising 2, 179,556 Acres.

article XIV, section 1 of the State Constitution to the extent hereinafter set forth. All land within the Blue Line, whether public or private, are subject to certain regulations which are not applicable to other state-owned lands outside the Blue Line, whether or not such lands are part of the Forest Preserve.

In the first place, state lands within these two parks are by law " forever reserved and maintained for the *free* use of all the people." Thus these two wilderness parks are distinguished from the 77 regular " State Parks " in connection with the recreational use of which by the public, the State may — and in many instances does — impose reasonable charges. It has been held that in the Adirondack and

Catskill Parks the State shall make no charge whatever for the use of such recreational facilities as it may provide. Therefore it will be seen that as far as state-owned lands are concerned, these great forest parks are in a class by themselves.

In still another way the scenic beauty of the Adirondack Park as a whole enjoys the full protection of the law. For more than a quarter of a century the use of advertising signs within the park boundaries, even on private lands, has been strictly regulated; and as a result the more objectionable of these blots upon an otherwise beautiful landscape gradually have been entirely eliminated. If you still see some of these signs while traveling through the park, it is only because they are within the boundaries of incorporated villages or located on land upon which the business advertised is actually conducted.

The Adirondack Park (in which lies the greater part of the Forest Preserve lands) covers a total area of 8555 square miles and is therefore larger than the combined area of the states of Connecticut, Delaware and Rhode Island, exceeding that of either Massachusetts or New Jersey and but a trifle smaller than either Vermont or New Hampshire.

The state-owned lands in this park constitutes the largest public playground in the Union — with one exception, the Yellowstone National Park which is only 55 square miles larger. If the entire Adirondack Park is considered as a unit — which to the visitor it essentially is — then its 8555 square miles make it by far the largest recreational area in the country if not in the world. It is to be hoped that the state holdings will be steadily expanded and blocked up into better administrative units.

These state-owned lands for more than

NYSPIX — Commerce

View From Bald Mountain, Old Forge

half a century have been under the protection of our State Constitution, which declares in no uncertain terms that "The lands of the State, now owned or hereafter acquired, constituting the forest preserve as now fixed by law, shall be forever kept as wild forest lands. They shall not be leased, sold or exchanged, or be taken by any corporation, public or private, nor shall the timber thereon be sold, removed or destroyed."

How did this comparatively enormous area of wild forest land come into the possession of all the people of the State?

During the colonial period of our history as well as in the early days of our existence as a State, great grants of land were made to private citizens, often for little or no compensation. These grantees subsequently sold their holdings in smaller parcels, commonly to pioneers, who attempted agricultural development. These often proved so unprofitable because of the lack of proper soil that they were abandoned. In other cases the forest cover was ruthlessly exploited, and when the timber was removed, the owners having no further use for the land, allowed it to be sold for taxes. At these tax sales, in the majority of instances, the State was the purchaser, and thus gradually again became the owner of over a million acres.

Then ensued a period of widespread depredation upon the State's lands by timber thieves until the scandal became so great that it was a stench in the nostrils of all decent citizens. Regulation by what was first known as the Forest Commission proving ineffective, public sentiment was so aroused that at the Constitutional Convention of 1894 the safeguard now known as article XIV was inserted in the new Constitution. Thereafter the State embarked upon a policy of outright purchase of private holdings, as distinguished from acquisitions through tax sales, with the result that today the Forest Preserve acreage has increased to its present total of nearly two and a half million acres.

Back of the policy thus inaugurated there are two basic philosophies, which may be denominated natural economic and recreational. From the natural economic standpoint, it has been maintained that the preservation of what is left of the forest cover in these two sections of the State and the restoration through natural growth of the forest formerly growing on the denuded and burned areas are vital to the continuance of our economic life. The headwaters of many of our important rivers are found in the Adirondack area, and to a somewhat lesser extent in the Catskill area. Without the forest cover on the steep mountain slopes, which holds the melting snows of winter and prevents flash floods at other seasons, these rivers would become raging torrents in the spring and shrink to mere brooks in summer and fall.

From the recreational standpoint, the continual harvesting of the timber under the old method of lumbering was fast resulting in the region becoming a waste of denuded land, often fire-swept and devastated to such an extent that the wildlife of the woods and waters, formerly so abundant, was fast disappearing for lack of the sustenance that Nature had formerly provided. Through the careful management by the state agency now designated as the Conservation Department, much of the wild population of the forests is no longer being depleted to the extent that it formerly was. It is claimed, in fact, that there are more wild deer in the State at the present time than there were when the Indians roamed its primeval forests; and that many a lake or stream which formerly teemed with game fish, and later became depopulated, is now being gradually restored to its former

status as the haunt of trout, bass and other favorites of the fishermen.

The continued protection and restoration of the forests is also appreciated by a growing body of outdoor enthusiasts who neither hunt nor fish. From early spring until late fall, hundreds of thousands of campers enjoy the free use of the growing number of campsites in those sections of the Forest Preserve which are accessible by paved highways; while a smaller but steadily increasing number prefer to use the state-owned lean-tos distributed along a network of foot trails. A quarter century ago the Forest Preserve was seldom penetrated in winter but today its winter use by skiers and snowshoers is growing literally by leaps and bounds.

It is to be fervently hoped that every boy and girl in the State will prize the wonderful natural heritage we have in our Forest Preserve and will become and continue to be a firm advocate of its continued protection from exploitation, either by commercial interests or by those who would like to see it so invaded by the refinements of civilization that its wild forest character would be forever lost.

NYSPIX — Commerce

Whiteface Mountain from Wilmington Road

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Cover Leaflets Available

Single copies of the colored cover picture of the moccasin-flower, with descriptive account, are available in leaflet form from the New York State Museum, Albany.

The State Forests of New York

A Cooperative Program Adds to the State's Natural Wealth

CORYDON D. KINGSBURY
Superintendent of State Forests
New York State Conservation Department

THE STATE OF NEW YORK has set a fine example for its citizens: under the enlarged Reforestation Program, it has planted 290 million trees as part of a long-range program to put to work idle or nonproductive acres.

It was only after extensive studies, begun in 1927 by the subcommittee on reforestation of the Legislative Industrial Committee, that plans for this program began to develop. This committee was ably assisted by such agencies as the New York State Grange, State College of Agriculture, Colleges of Forestry at Cornell and Syracuse, and the State Conservation Department. In 1929 enabling legislation was passed. This law, known as the State Reforestation Law, became chapter 195 of the Laws of 1929, and added section 60-*a* to the Conservation Law.

This law authorized the Conservation Department to acquire for the State, by gift or purchase, abandoned farm lands consisting of blocks of 500 acres of contiguous land to be forever devoted to the production and harvesting of forest products as the trees grow to merchantable size. This provision, you will note, is in direct contrast to section 1 of article XIV of the State Constitution relating to the State Forest Preserve land in the 16 Adirondack and Catskill Forest Preserve counties.

Under the authority granted by the new law, and with an appropriation of $120,000, the program of land acquisition, forest nursery expansion and reforestation was started. Based on the original land survey, five Forest Districts were established, with district headquarters located in Oneonta, Norwich, Cortland, Bath and Jamestown, each district being placed under the direct supervision of a technically trained forester designated as a district forester. The first plantings were made in the fall of 1929 in Cortland county, on lands designated as Cortland County Reforestation Area No. 1, in the town of Scott.

Any worth-while program carries with it the stamp of public approval, and the Conservation Department found little, if any, opposition when it requested further amendments to the law to increase the territory in which it could function and to obtain the necessary funds required to assure the department of a long-range, progressive and perpetuated program. The program in its final form, was thus expanded to provide for the purchase of about one million acres of idle land within a period of 15 years at a total cost of not to exceed $20,000,000. This, of course, included the expansion of State Nursery facilities to meet the greatly increased demand for trees and increasing the operating Forest Districts from the original five to ten districts, with additional district headquarters located in Lowville, Canton, Herkimer, Hudson Falls and Catskill. Under this established technical organization, the program was fully operating in 33 counties.

Now, after 21 years of continuous operation of the program, it is gratifying to note that the regulation of 50 per cent plantable lands has been consistently adhered to in each 500-acre unit. And, in no instance, has more than the maximum of $4 an acre been paid for any of the 545,000 acres acquired.

As often occurs to programs that require long-range planning, the unforeseen but inevitable adverse circumstances established themselves in the form of a national economic depression. This necessitated financial retrenchment of Conservation Department activities, which curtailed the land acquisition phase of the enlarged Reforestation Program. The other important phases, however, such as planting, construction of fire protection facilities (fire lines, water holes, fire towers), the construction of truck trails, the establishing of experimental plots for research and investigative purposes and the stand improvement, or cultural operations, on the existing natural stands, went forward at an accelerated pace with the advent of the large reservoir of labor supplied by the CCC, ably directed by technical and semiskilled personnel from the State Conservation Department.

After approximately ten years of intensive reforestation activities, the program had assumed noteworthy proportions: 485,000 acres had been acquired, on which planting had been completed on 340,000 acres with 262,583,483 trees. Due to the intelligent approach to the problem of adaptability of tree species to site (soil characteristics, drainage, exposure etc.), as designated in the Planting Plans for each area by the district foresters, an average survival of over 70 per cent was achieved. Fall planting, however, was found to be unprofitable except upon the lighter soils found in the northern portion of our State, and was discontinued elsewhere.

The program permitted a procedure of trial and error which has resulted in definitely determining the most desirable coniferous species to be planted in this State. Species have been selected, in the main, according to their demonstrated adaptability to the State's climate and soil conditions, as well as their resistance to diseases and insect infestations. The list at present includes such species as red and white pine, Scotch pine, Norway and white spruce, larch, jack and Austrian pine; recently, Douglas fir has

A Tree-Planting Crew on State Forest, Madison County Area Number 1

Spot Map Showing General Distribution of the State Forests
Each dot represents an area of 500 acres or more.

been added as it has shown considerable merit when planted on favorable sites.

As the basic reforestation progressed, the importance of several by-products of the program became increasingly evident. The stabilization of run-off, checking of wind and water erosion, increase in game population, and general recreational facilities such as hunting and fishing, are making favorable progress at this stage of the program. There is also, of course, the tremendous increase in esthetic values — green hillsides versus barren slopes.

Regarding one of these by-products of the program, the conservation of our water supply to maintain a normal water table, run-off and stream flow, is constantly checked and studied under a cooperative agreement between the Conservation Department and the United States Geological Survey. This cooperative stream-gauging project has been in continuous operation since it started in 1932. Data at the present time are being collected from three gauging stations located at Shackham brook in Cortland county, Cold Spring

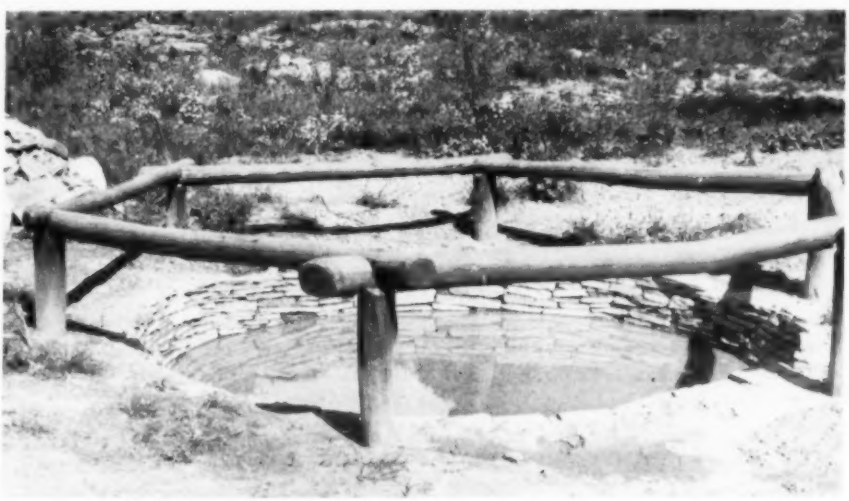
brook in Delaware county and Sage brook in Chenango county.

Another interruption in the program was caused by World War II. The program was greatly curtailed. But it is of considerable interest to note that German prisoners of war were employed to carry on a limited planting program and this type of labor, combined with the assistance of school children on Saturdays and enrollees from a Civilian Public Service Camp located in Cooperstown enabled us to plant about 900,000 trees during the war years.

The war years likewise afforded us an opportunity to catch up on some other important phases of the program, such as detailed appraisal of investigative data from numerous sample plots, growth studies and the plotting of all types of projects completed up to that time on key maps, known as Atlas Maps, located in the department office in Albany.

Shortly after the termination of World War II, plans were drawn for a resumption of all activities and funds were again made available to carry on a stepped-up program. Of prime consideration at this time, due to the fact that the early plantings were now in the 15 to 18-year-old class, was the cultural treatment of these plantations. This consists, in the main, of thinning and pruning, and at the present time we can report 46,635 acres thinned and 25,829 acres pruned. Along with these cultural operations, we have carried on silvicultural treatment (woodlot improvement) on approximately 159,000 acres of wood lots acquired in the land acquisition program.

In order to manage and protect over 545,000 acres properly, it is, of course, essential to have accessibility. This required the construction of new truck trails to inaccessible areas and the rehabilitation of old or existing roads. To date we have constructed and are maintaining approximately 243 miles of truck trails. These trails also act as excellent fire breaks for fire control purposes. But in addition we maintain over 1000 miles of fire lines and approximately 1200 water holes as a re-



A Water Hole in Cortland State Forest for Fire Protection Use, Built by CCC in 1937

serve water supply. These fire control facilities are augmented by strategically located fire towers under the supervision of the Bureau of Forest Fire Control. The net result has been that loss by fire in State Forests for the past 20 years has been relatively negligible.

Disease and insect infestation constitute another threat to our reforestation program. During the past few years experimental projects in the control of certain insects by plane spraying with DDT (under the supervision of the Bureau of Pest Control) have disclosed some gratifying results. But it is our belief that proper silvicultural procedure is the best method to employ in a disease control program, combined with reduction by chemical controls for use only during epidemic outbreaks.

Although the economic return from the State Reforestation project is probably of only secondary importance, it is of considerable interest to note that the sales of wood products (sawlogs from natural stands, cordage, pulp and stovewood, and posts and poles) have returned a revenue totaling $185,465.39. The largest return to date has resulted from the sale of Christmas trees (produced from cultural thinnings of the plantations) totaling $204,591.63. Miscellaneous receipts, covering such items as hay and pasturage and penalties from trespass, have produced an additional revenue of $30,009.89. An interesting source of revenue to the program has been derived from the sale of gas and oil leases in the amount of $139,543.65. The total revenues to date from all sources are thus $559,610.56, which represents an approximate return of about 4.5 per cent on the State's investment.

It is well to note that this program, relatively speaking, is still in its infancy. Definite and positive progress has been made, but the true value as to its economic and social assets to the State will progressively increase as the tree maturity stage is approached.

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Acknowledgment

This Arbor and Wild Life Day number of the BULLETIN TO THE SCHOOLS was compiled with the cooperation of the New York State Museum. The editor desires to express his appreciation to Dr Carl E. Guthe, Director of the State Museum; to Alvin G. Whitney, Assistant Director, and to all who contributed articles and photographs.

Good Manners Out of Doors

Here Is a Check List for All Who Travel in the Woods

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IN YOUR OWN HOME or in the homes of friends you follow certain commonly accepted codes of good manners.

In the woods there are different but no less definite rules of etiquette. When these rules are violated it is usually through carelessness or ignorance rather than through intent. Those who respect and know how to use the out-of-doors have the privilege and duty of helping others who are just getting acquainted with the forest environment.

Most of the following principles of wilderness manners are probably familiar to you. In fact you may think of some that have been omitted. The following suggestions are made in order that you may feel at ease and avoid danger or criticism.

Treat your parks and forests as thoughtfully as you would want others to treat your own garden or home. Remember that you and your family helped pay for the signs, benches, fireplaces and buildings, so help guard against vandalism.

Though in the wilderness, remember that others have preceded you and many will follow you. It detracts greatly from the charm of the wilderness to find candy papers, egg shells, orange skins, "pop" bottles or beer cans littering the trail or mountaintop. It is easy to bury these under a rock or rotten log.

Ask permission before going on private land, and be particularly careful of fences, crops and domestic animals.

Be careful about destroying vegetation. Do not needlessly mutilate flowers, ferns or trees, nor harm wildlife.

Play fair. Observe the fish and game laws. These laws regulate hunting to assure a permanent breeding stock and to reserve a fair share of game for each hunter. The true sportsman takes pride in playing the game according to the rules. He realizes that in a state where more than 14 million people live on 30 million acres, it is a near miracle that there is game left to hunt or land on which to hunt it.

Do not touch or disturb baby wild life. The young bird, fawn or rabbit that you think is lost or abandoned probably has parents near-by. They are waiting for you to go away so that they can return.

Be very careful with fire. Remove all inflammable materials to a safe distance before lighting your fire. Be sure it is out before you leave it. Extinguish every match. Crush out every cigaret. Tear the butt apart and dump the tobacco, to be doubly sure it is out. Be equally careful with cigars and pipes.

Build campfires only in safe places on sand or other mineral soil, or on rocks. A nearly dry stream bed or a beach is a safe place for your fire.

Above all, do not build a fire on duff (dry, decaying leaves, wood and other vegetable matter). Duff will harbor a spark for hours or days.

Each year thousands of acres of for-

Photograph and copyright by Fay Welch

Boys and Girls from Tanager Lodge Camp Construct a Bridge along a near-by Public Trail

ests are seared by fire. In a few hours these fires ruin forests that were centuries growing.

Most fires are caused by carelessness. A smoker drops a burning match or lighted cigaret or someone fails to quench his campfire. If most fires are caused by human carelessness, then most can be eliminated. Hence it is your and everyone's duty not only to be careful with fire when in the woods but also to educate campmates and friends to be careful.

New York State has an elaborate system for protection against fire, with forest rangers, observation towers on mountain tops, hundreds of miles of telephone lines, fire-fighting trucks equipped with two-way radios and even observation planes. You will enjoy visiting one of the fire lookout towers on a mountain. Trails to them are clear and well-marked, the mountaintop views are beautiful, and the ranger usually welcomes company.

Bury or burn filth and rubbish. Avoid polluting springs, streams or lakes.

Leave your picnic ground, campsite or cabin in as good condition as you found it — or better. The next man to come may be drenched or freezing, so leave a supply of dry wood and kindling in a protected place.

Help keep trails open and in good condition.

Whether you are hunting, fishing, camping or hiking it is well to carry matches in a waterproof container, compass, map, jackknife and first-aid kit. Of course you will want to carry your share of the lunches, extra clothing and other gear.

If you are climbing a mountain, do not race up it. Get started early enough to be unhurried. Enjoy the views, the trees, the wild flowers, the animal tracks. Woods walking and rock climbing are arts to be learned slowly.

The experienced hiker soon realizes the wisdom and courtesy of always telling someone at the base camp of his proposed destination and expected time of return. For if you spend much time exploring the woods, sooner or later you probably will get lost. You may be only mixed up for a few minutes or you may have to spend the night in the woods.

Practically the only real danger is within yourself — panic. Panic was once described as " when your heart is in your mouth, and your brains in your heels! "

Therefore if some day you suddenly discover that you are lost, take it easy. Sit down and think it over. Does anyone know approximately where you are and when you expect to return?

If so, better swallow your pride and stay right where you are until they come looking for you. If you keep wandering you will make their task much harder and you might be lost for two or three days instead of two or three hours.

How can you avoid getting lost? Here are a few important precautions:

When planning your vacation, get good maps of the area you plan to visit. Learn how to read these maps. Learn how to use a compass accurately and with ease.

When entering the area where you plan to camp, hunt, fish or ski, study your maps of the area and take careful observations. Note the location of bodies of water, directions that rivers flow, general character of the drainage, prominent landmarks (especially conspicuous hills or mountains) and main roads and trails.

Use your compass, when starting out, to observe the direction from camp to your objective. Then note what your reverse compass bearing should be to return to camp.

All campers should learn the importance of watching the weather. No storm ever strikes without warning. Usually these warnings are repeated with increased emphasis for some time. Therefore study the sky carefully, especially to the west, northwest and southwest. If out in a boat or canoe, watch the lake surface to the windward. Heed nature's storm signals: low, scudding clouds; a towering, flat-topped thunderhead; a black cloud bank rolling in from the westward; distant thunder or lightning; a blue-black squall track on the water; the dewless grass at dawn.

The skilled camper has little difficulty in keeping his camp clean, sanitary and safe. Once you have selected a good camp site, put up your tent, gathered a wood supply and prepared a fireplace, you will want to secure fresh drinking water and prepare a latrine.

The simplest and one of the most efficient toilets or latrines is a trench, eight to ten inches wide, about two feet deep and as long as needed. Excavated earth should be piled neatly near-by, with a spade, trowel or thin board kept available so that deposits can be carefully covered with earth after using. No latrine should be located within 50 feet of any watershed, stream, lake, spring or well.

Some public campsites have protected and tested wells but usually you must act to safeguard the water you use. Vigorous boiling is generally the easiest method. Another way is to chlorinate the water, for example, by adding halazone tablets from your first-aid kit. Directions are on the bottle. Springs in areas frequented by humans must always be regarded with some suspicion as they are subject to pollution by surface wash.

Always keep in mind that no human

Photograph and copyright by Fay Welch

Beautiful Mountaintops Should Be Kept As Clean As Great Cathedrals

wastes should be placed where they can possibly contaminate drinking water or food supplies.

If you are careful to keep food wastes reasonably dry you will find that most of them can be burned. Otherwise bury them. Burning has the great advantage of eliminating "reburying" when there are foraging raccoons or bears around. Tin cans can be burned out, crushed flat and later buried. Glass bottles and jars should be buried, not broken; and trash can be burned.

Good campkeeping is like good housekeeping at home and is essential to health and cleanliness.

The true woodsman is truly courteous — always friendly, hospitable and considerate, ready and willing to help anyone in need.

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For further information on this subject write to the Department of Public Information, New York State College of Forestry, Syracuse 10, New York, for the 48-page booklet, When You Are in the Woods. Single copies are free.

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Parks are valuable natural resources — not only because of their recreational functions; or because of their scenic and other inspirational values — but also because they provide natural environments where we can best teach people how to intelligently use their own public property, and a recognition of their personal responsibility for conserving those properties and *all* of our natural resources.

— ROBERTS MANN, in *Parks and Recreation*, October 1950

Sanctuaries and the Facts of Life

Location Is Important and a Custodian Is Needed To Protect a Sanctuary from Vandals

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THE SASSAFRAS WOODS became the Sassafras Bird Sanctuary 21 years ago. Now is as good a time as any, perhaps, to do a little soul searching and to ask ourselves what the experiment accomplished and what we learned. We learned plenty, you may be certain, and much that we learned was on the maddening side — the red side, so to speak, of the ledger.

We still have our beautiful 75-acre tract of mixed woodland protecting the steep slopes of our picturesque ravine. Dove creek still flows over its ledges and around its mossy boulders the year round. Yearly the Louisiana water-thrush hides his nest under overhanging banks and veeries repossess the shady streamside levels. The birds and small mammals happy in such a habitat continue to enjoy it. The stands of the great white trillium and the sparse old mats of trailing arbutus still hold their own. We still have our two flanking wild fields where field sparrows, kingbirds and meadow larks have a busy season summer after summer.

All this is to the good. So far this inviting area remains safe from heaven-knows-what horrible possibilities of a utilitarian nature.

Have you in your community a natural wildlife habitat that should be saved from a fate worse than death? Our Nation — and New York State as much as any — needs to save many more spots of this sort so that our people can see, if only as outdoor museum pieces, Nature's complicated but effective way of proceeding about her ancient business. Year by year, month by month, these spots are being wiped out in the name of what we think is progress.

The rescue of such a spot, vital as it is, is only the beginning. We can not sit back and bask in what we consider security, even in the matter of sanctuaries, because there is no such thing in this uncertain world. Eternal vigilance is the price of liberty — and the price of sanctuaries, national parks and every one of our priceless natural assets. Constant attempts at intrusion into our State Forest Preserve, our national parks and monuments, and our wildlife refuges are being made by all sorts of commercial pressure groups, lumber interests, livestock interests, mining interests, electric-power interests and mass recreation interests — to mention a few of those out to gain something at the public expense. There is no let-up in these pressures; they are in full swing right today.

Since serious changes can be made, the backers of the Bird Sanctuary do some heavy worrying from time to time about its permanence. Owned by the city, the sanctuary sometimes irritates the administration by troubling its conscience for the simple reason that it can not provide a warden, wages being what they are; neither can the Sassafras Bird Club, which named itself after the sanctuary

and to which is assigned by the city the responsibility of supervision of the 75-acre area.

As matters now stand we have the area and it is established as a true sanctuary. The city holds title to it. It is still being used by school classes and other groups as an outdoor laboratory and for field trips and is as well liked as ever for these purposes. It is as full of interest for these observers as it ever was. But our bright dreams of making the trails more meaningful and pleasant for the casual stroller or the general public proved to be illusory. On four separate occasions we set up nature trails, calling attention to special items of interest or asking a leading question or two, naming some of our wild plants and trees and giving significant information about them. On each occasion our markers and signs were torn down or pulled up in short order by some of these casual strollers who are apparently allergic to information, however sugar-coated.

The accessibility of the sanctuary, even on foot or by bus, which we once thought would be a great asset in bringing pleasure and enlightenment to our visitors, turned out to be a curse rather than a blessing. Every convenience placed in the sanctuary for the benefit of its guests has been the constant target of depredations, summer and winter — depredations which we know have been the work of a very small lunatic fringe represented by about one out of every thousand visitors; a minor element, to be sure, but how potent!

After 21 years, we still do not know the answer to this unceasing problem. Even if we wished to, we could not prohibit entry, since it is public property. The city can not use barbed wire fencing because a trespasser hurting himself on such a fence could sue the city. In any case, it would not be fair to exclude from our sanctuary the 999 decent citizens in order to keep out the one who is contrary-minded.

The other solution, the services of a full-time protector, has so far been financially unattainable. And full time it would have to be, since our worst vandalism is carried out under cover of darkness. Since 1940 we have had a well-constructed trailside museum building, built by NYA labor. Despite the fact that this structure is visible from homes and from the street itself — it has been vandalized at least once a year, with one single exception, for the past 11 years. After a couple of showcases had been smashed, we decided it was high time we moved out anything of value. Then another gang, a year of two later, broke in and tore to pieces a dozen large mounted bird specimens which we had ventured to leave behind because, fortunately, they were surplus. Last year a third group entered by removing an entire window frame — shutters, bars and all — and built a bonfire in the middle of the workroom floor, a bonfire which left a blackened hole but, by some miracle, failed to burn down the building. Since the building with its big fireplace, its tables, benches and cupboards now fills only a minute part of the program for which it was intended, we are not too disturbed by the prospects of a successful job of arson some nice spring day. And I mean spring day, for that is the way we hail the advent of the season in these parts; it is then that we pull off our best vandalistic jobs, in our excess of joy and hope reborn!

Twice a heavy footbridge across a side ravine has been laboriously demolished. One of these was made of one-foot logs; the other of 12 by 4-inch planks. Safety railings and some of the planks have been torn from all our other bridges. Two of the five ponderous concrete-and-iron-grill

fireplaces in our small picnic area have been destroyed at the cost of what must have been plenty of sweat — but not, unfortunately, of blood and tears, unless you count our own. One Labor Day, a picnic party concluded an outing by chopping up all the heavy picnic tables and using them to prolong their cheery evening fire.

Infuriating though the recital of these witless acts may be, it makes this point: There is much more to a sanctuary than the simple project — not always so simple, either — of establishing it. We must be fortified, both physically and spiritually, to go on from there. But our vision of the sanctuary as a place of inspiration and information to the public has had to be set aside.

It is the works of man — not the trees or plants or wildlife — which bear the brunt of the punishment dealt out to our sanctuary. The sight of such man-made things as feeding stations, footbridges, trailside signs and the like, unobstrusive though they may be, are more than some of our youthful (?) citizenry can endure. In some dim, dull way they resent being reminded of the fact that somebody cares for a wild-land area. Believe it or not, one winter a man regularly made the rounds of the winter feeding stations, removed the suet and took it home to his chickens. He watched when the schoolboys came to replenish the supply.

We find a real educational value, left-handed though it is, in the wreckage left by the vandals. The schoolboys and schoolgirls, seeing the destruction wrought, express their indignation in no

Photograph by Mrs Alice B. Reynolds

School Boys and Girls on a Field Trip to the Sassafras Bird Sanctuary — Which Still Has Some Birdhouses

uncertain terms and even more brutally than their teachers and guides. They want to know what makes people do such things, and have as much trouble understanding why as do the rest of us. This leads into a spontaneous heart-to-heart on-the-spot discussion of such timely topics as good citizenship, responsibility, fair play and conservation. The youngsters' sympathies are awakened and they receive some impressions much more vivid than an experience when all was in good shape could possibly provide. Unfortuntaely not all the boys and girls of our city can be given even this brief training.

For years the sanctuary was the scene of varied conservation activities carried out with enthusiasm by student groups themselves, especially in the way of plantings, in the setting up of bird-attracting devices and in a program of winter feeding. For several years food-bearing bushes of a species appropriate to the locality were planted, the students even contributing the funds to purchase the stock which they set out. In other years they carried through more visible projects such as plantations of recommended evergreens in portions of the old pasture land adjoining the woods. The little trees grew and flourished — until a grass fire set by some neighboring landowners swept through the sanctuary's woven-wire fencing and in a few minutes wiped the little trees out of existence.

The mayor and the city fire department, cooperating with us, have put on special anti-grass fire campaigns through the press and otherwise. They have made pleas and issued warnings which have been heeded about as much as have the unceasing national appeals to motorists to drive carefully and save lives. Three years ago, a particularly vicious grass fire, spreading from a good housekeeper's burning of debris in her backyard and threatening homes and garages for half a mile, roared into the sanctuary fields and killed 500 thriving pines, a dozen years old and standing higher than a man's head. That was the last straw — and the third time our plantations had been wiped out! We no longer have the heart even to suggest any further reforestation projects. The record certainly gives no inspiration for our boys and girls to continue their good labors. They, too, recognize futility when they come face to face with it.

There is more to the establishment of a sanctuary, we have found, than meets the eye. Unexpected secondary problems rise up and gallop about. More than such agencies as conservation and education become involved. Such departments as fire, public safety and public works are dragged into the act — even in the preservation of an unpretentious 75 acres.

We are thankful that a beautiful natural area has been preserved and that it is being used to good ends by many public school classes. But if we had it to do over again we would never select so accessible a territory, which could be reached so effortlessly and quickly by walking. A location a few miles away on a side road in the country would be much preferred — one not subject to the evening rambles of vandals and irresponsibles, yet easily reached by school buses or by the automobiles of the genuinely interested.

Or, if we had it to do over again, we would know before we started how some proper protection could be financed and a custodian, with police powers, kept on the job. We would not trust to luck and the righteousness of our cause.

The Conservation Caravan

Teachers Deserve --- and Get --- a Break

MABEL H. JAMES
Chairman, The Conservation Forum of New York
Holland, N. Y.

WE WHO WORK in the field of conservation feel that educators should be well grounded in knowledge of natural resources and their wise use. We urge the reading of excellent (if heavy) volumes, of magazines, government bulletins and pamphlets; we point to courses in conservation and nature study, to workshops and field trips and to memberships in national and local organizations whose concern is with natural resources and the survival of mankind. We would like our teachers to pursue these many avenues to knowledge. Like pressures exist in other fields of study. What shall be done?

The Conservation Forum is in part answering this query with a project that won acclaim in 1949 as the first Conservation Caravan in the Nation; it was repeated, again on a small scale, in 1950 and was notably carried out in late summer, 1951. The Caravan is an informal traveling school of conservation, nature study and ecology, sponsored jointly by the Conservation Forum of New York State and the Buffalo Museum of Science and directed by the writer. Each day the group moves on to " fresh woods and pastures new," and to acquaintance with experts and specialists in soil science, botany, fisheries, wildlife, forestry or farming, or other fields of knowledge contributory to understanding of natural resources and their use.

The 1949 Caravan started from headquarters in Buffalo with a visit first to an abandoned limestone quarry where the study of fossils of some 300,000,000 years ago definitely placed our human race as late-comers on earth. This geological visit was followed by study of the vegetation of the Onondaga limestone escarpment. Later stops gave opportunity to observe farm practices, soil conservation, reforestation projects, bogs in bloom, beaver ponds, fish hatcheries and commercial fisheries. This trip and the following one in 1950 were both made in private cars, driving some 600 miles in each 10-day Caravan.

In the June-July 1950 Caravan the start was again with a geological trip, this time to the Niagara gorge near Lewiston. Lunch at Niagara Glen (Canada) was followed by tree study in beautiful Victoria park and at the near-by School of Horticulture. After dinner in Lewiston a program at the Bark House, Tuscarora Reservation, revealed a wealth of Indian custom and tradition. Succeeding days took the group to a private arboretum, the Oak Orchard State Game Refuge, Bergen swamp, a Rochester park, Hemlock lake, — source of water for the city of Rochester — the Mount Morris Dam, still in construction, Letchworth park and Houghton College. The Caravan spent a day in Allegany county with its district soil conservationists and had lunch in its county forest; they drove down into Pennsylvania to Cook Forest with its majestic pines and hemlocks and alluring trails, visited Heart's Content, a bit of primeval forest within the Allegheny

National Forest, viewed the perennially black Clarion river, for which hopes are now entertained of its eventual restoration to cleanliness, and saw the effects of strip mining. Back in New York, the Dunkirk-Fredonia area provided much of interest, and excellent birding was enjoyed at Kent Switch.

These two trips showed that there are many well-informed men and women who are delightful to meet and who are ready to share generously their special knowledge and enthusiasms. The Conservation Caravan could not, however, be termed relaxing for those who had the task of driving the cars. There must be a better way, we thought, and this became a reality with the 1951 Caravan.

By chartered bus an eight-day trip from Buffalo through the Finger Lakes area to the Hudson, the Catskills and the Adirondacks and back to Buffalo, all in carefree comfort, was enjoyed by 22 Caravaners from August 25th to September 1st. The generous cooperation of conservationists, specialists and scientists provided us an average of four instructors or guides daily.

From the Taylor Wine Company's contoured vineyards above Keuka lake the trip led to the Fellows farm near Ithaca, where a complete soil conservation plan is in effect, and to Taughannock Falls Park and Inn. Next day the way led through the ever-beautiful scenes of New York State to Gilboa reservoir, where were seen the remains of the world's oldest fossil forest. At near-by Prattsville, Waltonian F. Lee Keator disclosed to us some of the threats to natural resources that are engaging conservation effort throughout the Nation. The second night, after a memorable drive through the Catskills, was spent at Germantown on the Hudson, thanks to the hospitality of Mrs Frank B. Washburn, president of the Hudson River Conservation Society, in whose home we learned much about the river and its problems. The third day took us to the arboretum of Senator Thomas E. Desmond at Newburgh, to Spring Valley in Rockland county, where we lunched with presidents and members of the Rockland Audubon Society and the Rockland County Conservation Society, and had an hour with Dr E. E. Pfeiffer (author of Earth's Face and Human Destiny and internationally known soil scientist) in his laboratory. We proceeded across the Hudson and Westchester county to the Audubon Nature Center, which is just over the line in Connecticut, there to enjoy the unique nature museum and nature trails administered by Director Charles E. Mohr. That evening we reached Vassar College, where we were to spend two nights at Alumnae House. On the fourth day we crossed the Hudson to West Park, guided by Mrs Inez M. Haring, chairman of the John Burroughs Memorial Association. At Riverby we sought out Julian Burroughs, the writer's son who in many ways resembles his famous father, and with him went up the hill to Slabsides, which is maintained by the association just as it was when John Burroughs lived and wrote there.

Midafternoon of this fourth day found us at Hyde Park, where with scores of other visitors we toured the Roosevelt mansion. Superintendent George Palmer talked with us of the late President's interest in trees and his care for those on the estate and Dr Edgar B. Nixon followed with an account of F. D. R.'s interest in conservation as revealed in his unpublished letters and papers. Mrs Roosevelt spoke on "Conservation in the United Nations," reviewing much that needs to be done and describing some notable accomplishments.

From Hyde Park we proceeded to Millbrook to see at Thornden the world's largest red oak tree (circumference, 25

Kodachrome by Ruth Schmidt

The Caravaners Lunch at Slabsides with Julian Burroughs

feet) as well as other notable trees and a remarkable yew garden; then back to Vassar, where we enjoyed an after-dinner stroll in the ecological gardens with Dr Mildred Southwick of the Botany Department.

Delmar Game Farm and Research Laboratory and John Boyd Thacher State Park in the Helderbergs were on our schedule for the fifth day. We managed also a brief unscheduled visit to the State Museum in Albany to see the excellent Devonian exhibit presenting a restoration of the Gilboa forest of which we had seen some actual fossil stumps at Gilboa. On this day we learned a great deal about the wildlife and research activities of the State Department of Conservation, had an enjoyable botanical and geological Indian Ladder trip at Thacher Park with Botanist Stanley Jay Smith of the State Museum, and reached the Schenectady home of Paul Schaefer, who is president of the Friends of the Forest Preserve, in time for kodachromes of the Adirondack Forest Preserve as well as an enlightening talk on weather-making by General Electric Research Engineer Vincent J. Schaefer.

Next day we headed for the State Forest Preserve under the expert guidance of Paul Schaefer, stopping briefly at Saratoga Springs to view the activities of the world's largest forest tree nursery, conducted by the Conservation Department, and to taste the medicinal waters at a public spring. Within the Forest Preserve we visited the Giant's Bathtub on the east branch of the Sacandaga, where bathing, botanizing, sketching and resting were enjoyed in a setting of unspoiled natural beauty.

At noon the next day we left the Adirondack country on our way to points west. On the final morning we saw, with officials of the United States Fish and

Wildlife Service and with Director Fred T. Hall of the Buffalo Museum of Science, the remarkable bird life of Montezuma National Wildlife Refuge.

We traveled some 1200 miles. Careful arrangements had been made in advance for meals and sleeping accommodations. Participants included a businessman, two college students, a vacationing postal employe and his wife, a switchboard operator, a museum instructor, an artist, a librarian and a dozen teachers. The nonteachers were largely "scouters" or "birders" or both, with keen appreciation of the outdoors. Good fellowship prevailed and was evident at a well-attended reunion.

The 1952 Caravan is presently being planned. In Ithaca the group hopes to meet that grand old man of horticulture and nature study, Dr Liberty Hyde Bailey. Other distinguished Ithacans are expected to explain the Cornell Plantations and soil conservation demonstrations on farms. Next will come a visit to Hawk mountain in Pennsylvania where Curator Maurice Broun (author of Hawks Aloft) will be our guide, and also Mrs C. N. Edge of the Emergency Conservation Committee, through whose vision and effort this famous sanctuary now exists where formerly migrating hawks were shot by thousands for sport. An "organic gardening" center, the Hudson River valley, Adirondack and Catskill areas are also to be visited.

Inquirers will receive the schedule and other pertinent information. Reservations are now being accepted at $80 for the eight-day trip, including all living costs, transportation and instruction. Registration fee is $15 (returnable up to June 30th); the remainder ($65) will be due August 1st. Checks should be payable to the Conservation Caravan.

Kodachrome by Ruth Schmidt

The Bus Waits While the Balmville Cottonwood Tree is Measured: Circumference 23 Feet, 9 Inches

The European Hare in New York

Now Well Established, This Large and Hardy Foreigner Is a Menace to Orchards

WILLIAM J. HAMILTON JR
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Cornell University

THE INTRODUCTION of foreign animals into the United States has been faithfully recorded by many writers. Some of these introductions, as the English sparrow, the starling, the gypsy moth and other species, have been much publicized. Less known, and little heralded, was the introduction of the European hare at Millbrook, Dutchess county, New York, about 1893. A resident of this community imported several hundred of these big hares, solely for the sport of coursing. Over the years this gentleman introduced additional hares. In the more than a half century following their introduction, the European hare has increased and spread beyond measure. The hares moved from the site of their original introduction, spread into adjoining counties and finally to neighboring states. Eventually they became well established along the east shore of the Hudson river, in western Massachusetts and Connecticut. That these animals have spread far from their original "planting" is indicated by a recent record from Herkimer county.

Few can mistake this introduced foreigner. The cottontail and snowshoe rabbit have relatively short ears, while the hare we are concerned with has tremendous ears, measuring four and a half to five inches. The great hind legs are far longer than those of our native species. Indeed the big hare will often run like a dog, standing on tiptoe, quite unlike our cottontails. It is seldom that our native rabbit will exceed three pounds, while a big snowshoe hare will occasionally pass the four-pound mark. A Millbrook specimen of the European hare which I weighed brought the balance to nine and a half pounds; and 14-pound individuals have been recorded. The black upper part of the relatively long tail is another diagnostic character.

Often mistaken for our western jack rabbits, these hares may upon occasion give rare sport to the hunter. Unlike our native cottontail, they seldom hole up before the hounds and in the deepest snow and coldest weather may be counted on for a good chase. The hare's speed all too often outmatches that of the best rabbit dog, the trailing canine usually being outdistanced after a short chase.

The damage to our orchards by these large hares has often been severe. In 1932 I visited an apple orchard near Poughkeepsie where the hares had stripped the bark from young fruit trees, leaving only the shredded remains to indicate the destruction wrought by their nocturnal forays. A single hare can cause great mischief in a single night.

Control by shooting is the most feasible remedy where the hares become too numerous. Early annual pruning of fruit trees will help minimize the damage since most hares will bark the cuttings rather than strip the trunk and lower branches. Heavy snowfalls reduce

the effectiveness of mechanical barriers about the trunk. Chicken wire or hardware cloth, used as a guard, seldom serves to reduce damage by this long-legged fellow. The hare will stand almost upright on its strong hind legs to nibble above the wire barrier.

Winter holds little terror for this well-furred beast. Long before the cottontails and snowshoe hares have considered family duties, this giant has produced a first litter. In our State the first broods, usually one or two, are born in February. Probably several litters are produced in a year, but on this matter we have no specific information. At birth the young are well clothed with hair, the eyes are open and the leverets are soon able to care for themselves.

While the European hare may be an interesting addition to the fauna of our State, the peril of any unwise introduction of this sort must remind us of other past disastrous consequences. The big hare has spread almost beyond belief. It does appear to find a niche of sorts and settle down in some areas, while other habitats less desirable seem not to be populated by the hare.

Can we cope with this pest? It is here to stay, regardless of any organized efforts at control. As with other introduced animals, we are faced with a problem that can not be easily resolved. Vigorous efforts at control by hunting and trapping may minimize damage locally, but the European hare knows little of the man-made war against it. For better or worse, we can not easily rid ourselves of this pest.

Those who know the animal, its present range and habits, would serve the writer by sending along such information as they may have on the hare. Only in this manner can we plot the distribution of this species, find its present whereabouts and advise those whose crops it may damage.

The European Hare Has Extremely Large Ears and Woolly Pelage

Trees in the Hudson Valley

An Interesting Problem for Your Observation As You Hike or Ride

HENRY K. SVENSON
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EASTERN NEW YORK is a great meeting place for various biological zones, and these zones are no better shown than in the distribution of various species of trees. It has been my privilege to see much of the area as well as that of New England, and to study the complicated biological problems which are reflected in the geographical distribution of native trees. Some years ago (1909) a book was published by the New York Botanical Garden for the modest sum of 25 cents which described the New York Botanical Garden and in an appendix of 57 pages dealt with the "Native Trees of the Hudson River Valley." There are 22 plates of trees, of which 12 are from New Baltimore in Greene county. One of these is the bur oak, a tree which I have never had the good fortune to see in the Hudson valley. No one knows just what are the factors which limit the ranges of trees, but in our area they seem to be bound up with temperature and perhaps soil. The seedling stages of trees seem to be the most significant, and if a tree is moved and planted after the seedling stages are passed it will often grow into a mature tree at locations much beyond its natural limits. It is easier to work with trees which reach into our limits from the South than to try to figure out the southern limits of such northern trees as the spruce, tamarack, mountain ash, white birch and red pine.

On Staten Island, near the old clay pits in the southern end of the island, there still occur two interesting trees which reach their northeastern limits from the South. One of these is the Virginia or scrub pine and the second is the yellow or short-leaf pine, both of which are locally abundant in New Jersey. Climate would seem to be the limiting factor in the case of these two species. South of the Raritan river both the pitch pine and the yellow pine grow together, one just about as common as the other. The two species can be easily distinguished from a distance once the characteristics are pointed out, but most people are unaware that two distinct pines are represented.

Associated with the pines on Staten Island is the tree which has the most curious distribution of any in New England or New York. This is the red or river birch. It is known also from the valley of the Ramapo river near Suffern and along the west bank of the Hudson for a few miles below Saugerties. Some years ago it was reported from the eastern tip of Long Island near Riverhead, then curiously enough it skips to the valley of the Merrimac and its tributary, the Sudbury, in northeastern Massachusetts, and extends for some miles up along the Merrimac into New Hampshire. The region in between has been well investigated by botanists but no trace of the river birch has ever been found. Nobody knows why it does not occur in the intervening territory.

The persimmon, known for its puckery fruits before they are dead ripe, is also frequent on Staten Island and it extends along the coast to Pelham in Westchester county. Then it is known from Lighthouse Point near New Haven in Connecticut where there are about 125 old but small trees exposed to salt water influences. Except for this Connecticut station in which the trees are suspected of having been planted, the most northern place seems to be at Franklin lake in Bergen county, New Jersey, only a few miles south of the New York State line. Here the trees grow at the margin of the swamp with their bases in water at least part of the year, a most unusual habitat for the persimmon.

Characteristic of the coastal plain is the sweet-smelling *Liquidambar* or sweet gum. This is a fast-growing tree of the coastal plain which stops abruptly in the vicinity of Jones Beach on Long Island and near Darien, Connecticut. It runs up along the Hudson river to the Highlands and was long ago reported from Chatham in Columbia county, which would seem to be considerably out of its range. This is one of the fastest growing trees in the New York region. The tree has five-parted leaves and the conspicuous burlike fruits are found abundantly on Staten Island and western Long Island. It has just about the same fragrance as the sweet fern, which accounts for the fact that Linnaeus, having only fragments of American plants, described them both under the group *Liquidambar*.

Following along the valley of the Hudson river to Dutchess and Greene counties is the pin oak. It is likewise one of those trees limited to the western portion of Long Island and its drooping lower branches are familiar to everybody who has traveled on the railroad between New York and Philadelphia, where it is perhaps the commonest tree. The pin oak has become very popular as a shade tree in cities since it transplants easily, grows rapidly and will withstand city conditions. It grows along the Hudson and far up into the foothills of the Catskills west of Saugerties.

Spreading out a little beyond the range of the pin oak is the tulip tree. The scientific name *Liriodendron* comes from two Greek words meaning "lily" and "tree." This relative of the magnolia is native to China and eastern United States. If someone could find a tulip tree which produced flowers before the leaves, as the Japanese magnolias do, it would be a

Courtesy, United States Forest Service

An Open Grown Tulip Poplar of Good Form

real horticultural discovery. As it is, the beautiful yellow and orange-striped flowers tend to be hidden by the leaves. The tulip tree runs to about the vicinity of Albany. I found a half-dozen small trees in Pine Plains in Dutchess county on a sheltered limestone hillside within the area used by the American Museum of Natural History as a basis for the Warburg Memorial Landscape Hall. It extends to the Berkshire region of Massachusetts and to Worcester county in Massachusetts, but planted trees will grow much beyond this range. It reaches about halfway down the length of Long Island. The tulip tree or yellow poplar is one of the most magnificent trees of eastern North America, and enormous specimens are still common in Westchester county and on Staten Island.

This list of trees so far deals with species which are characteristic of southern United States. But there is a group of trees which one may observe to drop out gradually as he ascends into the Catskill mountains or the Adirondacks. I have in mind especially the road running west from the city of Catskill up into the Windham valley. Before one leaves the steep part of the climb, the white oak, pitch pine and sour gum are fairly common trees but they seem to be entirely absent from the mountains themselves. The pignut hickory runs about to the observation tower and then is not found until one descends into the Schoharie valley around Lexington and Prattsville, where its abundance gave the Indian name " Kiskatom " to the countryside. If one wishes to follow up the valley from the Schoharie reservoir, he will see that the white-barked sycamore trees run to about 1500 feet elevation just above Windham and then stop. The red cedar has about the same altitudinal range though it extends three or four miles farther up the valley. The next tree to drop out is the hornbeam or water beech (*Carpinus*) and the last of the lowland trees is the red oak. This runs up the valley to about 2200 feet and then is found on the south slopes up to about 3000 feet but is entirely lacking on the cold north slopes. I have made temperature records for some years in this Windham valley in the northeastern Catskills and I suspect that the progressive limits of the trees are largely determined by the severe winter climate and the short summers.

I believe that the other stream valleys running into the Catskills and Adirondacks should be investigated from this point of view, and if we could map the penetration of the upper limits of species in these river valleys and correlate them with the temperatures, we would begin to get some knowledge of the actual various factors which determine the geographic limits of these trees. It would be a most interesting and instructive problem to follow up the Mohawk, the Normanskill, the Catskill and especially, above Corinth, the Hudson river, noting exactly where the trees of relatively southern distribution disappear.

At one time the chestnut was an abundant tree in the Hudson valley but it has become so depleted that one scarcely knows whether to include it now in the list of native trees. It is true that sprouts come up from the resistant collar which lies between the trunk and root. These sprouts may grow up sufficiently high to bear chestnuts but they eventually die. The chestnut disease started in New York City about 1900 from nursery stock imported from Japan. It has now spread throughout the natural range of the American chestnut. It is interesting to note something of the original distribution of this tree, stumps of which are still encountered in the forest. It extended northward in the Hudson valley to Wash-

ington, Fulton and Saratoga counties and there were scattered trees as far as Burlington, Vermont. Otherwise in New England it reached to southwest Maine and I remember seeing a large tree on the slopes of Mount Israel near Sandwich, New Hampshire, probably the northern outpost for this species in that state. Thus the chestnut is seen to occupy a northern range about the same as that of the white oak. The destruction of the chestnut has been tragic. Through the efforts of Dr A. H. Graves of Wallingford, Connecticut, it is possible that hybrids of the Japanese, Chinese and American chestnuts which he is developing will combine the timber and nut-producing qualities of the American tree with the disease resistance of the Asiatic species. If so, we may expect that eventually the chestnut forests of eastern United States will be restored and remain resistant to the blight.

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Wildflowers in Brooklyn

Thousands Seek Seclusion of the Botanic Garden "Perhaps To Escape the Unreality of City Life"

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THE BROOKLYN BOTANIC GARDEN is actually composed of several gardens within a garden. The Wildflower Section is one of these smaller gardens. It is a two-acre tract of land effectively isolated from its surroundings by a fence and by trees and shrubs. Though one boundary of this area is but a few feet from an important traffic artery, an eight-foot high border mound covered by trees and shrubs cuts out distracting street noises. These and other mass plantings are carefully planned to obscure all views of the city, so that upon entering this garden of wild plants one has the feeling that he is really in the country and far removed from the bustle of the city which surrounds him. The birds have discovered this secluded haven and can be seen in a surprising variety there, especially during the migratory seasons.

Construction of this section was begun in 1911, only a year after work was started on the garden as a whole — to reclaim it from the dump which had for many years occupied the area. Obviously, the last vestiges of the native vegetation had long since disappeared and the planners had to start from scratch.

At first the section was planted in a botanical-relationship arrangement, with plants grouped in genera and families. This early work was done under the guidance of Alfred Gundersen. In 1931 reconstruction was begun on a natural ecological basis under the supervision of Henry K. Svenson. Work on this reconstruction continued into 1942 and, in the course of the work, miniature replicas were constructed of the various outstanding natural habitats to be found within a 100-mile radius of New York City. Plants

Courtesy of Brooklyn Botanic Garden

The Rock Ledge with Columbine (Aquilegia canadensis) Growing in the Crevices

for these facsimiles of natural habitats were obtained by collection from the wild, and by gift and purchase. In making collections in the wild, care was taken not to remove species of plants which were already scarce or threatened with extinction. These rare plants were obtained from nurseries growing wild plant species. Such exotic plants as dandelion, burdock and daisy, long since introduced from Europe, have been excluded from the area in so far as is possible.

Just inside the rustic gate is a bank of serpentine rock, moved in from Staten Island, thanks to the special financial assistance of Hilda Loines, Botanic Garden trustee. On this rock will be found growing such characteristic plants as harebell (*Campanula rotundifolia*), creeping phlox (*Phlox subulata*), sundrops (*Oenothera fruticosa*), shooting star (*Dodecatheon meadia*) and spurge (*Euphorbia purpurea*).

Farther in, along the grass path, is the bog which dates from the original construction in 1911. Under the bog and hidden from view is a concrete basin about 50 feet long and 18 inches deep with walls and floor six inches thick. This is filled with peat moss and in and around it will be found such bog plants as bog laurel (*Kalmia polifolia*), pitcher plant (*Sarracenia purpurea*), sundew (*Drosera*), swamp pinks (*Helonias bullata*) and cranberry (*Vaccinium macrocarpon* and *V. Oxycoccos*).

Across the grass path from the bog is a shallow pond representing the sand-bordered kettle-holes of the glaciated part of Long Island. In it grow the golden-club (*Orontium aquaticum*), pickerelweed (*Pontederia cordata*), arrowhead (*Sagittaria latifolia*), gold-pert (*Gratiola aurea*) and other water plants.

Beside the pond is the sand area for which 8 to 12 inches of white sand was

spread over the clay-loam soil. Here grow the light soil or sand-loving plants such as the bearberry (*Arctostaphylos uva-ursi*), the ipecac spurge (*Euphorbia ipecacuanhae*), sand-pink (*Silene caroliniana*) and the butterfly-weed (*Asclepias tuberosa*).

About a third of the area is covered by a woods of oaks, beech, birch and maple, which protects a wide variety of spring woodland flowers.

Besides these habitats there are others such as limestone and granite ledges, a plain, a wet meadow and a wooded brook. There are, altogether, nearly 500 species of plants growing in this wild garden and though the majority of them maintain themselves rather well, some have to be replaced from time to time. In particular, the woodland lycopodiums and some of the orchids have refused to grow.

Despite the fact that these quite diverse habitats are crowded together in this small area, the resulting whole presents a remarkably natural aspect. This naturalness is interrupted only by the grass path through the center and the small labels which enable visitors to identify the plants.

This wild garden is unique in the metropolitan area and each year thousands of people seek its seclusion — perhaps to escape briefly the unreality of city life. The entire place seems to demand that one pause to enjoy reality and the simple beauties of nature. Woodland meditation is rewarding, and little wonder that so many seek it.

Such an ambitious undertaking as this requires very extensive knowledge of the soil, moisture and general ecological requirements of all the plants involved. For this reason it should not be undertaken by the amateur gardener. On the other hand, simple wildflower and natural woodland demonstration and display plantings are within the ability of anyone provided he gives some attention to the individual requirements of the plants used.

Courtesy of Brooklyn Botanic Garden

Late Summer-View Showing the Planted Sand Area with Woods in the Background

If these wild gardens are started on a very small scale and gradually expanded, much can be learned. A gardener should obtain the rare and uncommon plants from nurseries, of which there are several offering wild plants at small cost. Some of these commercial growers offer their plants with a written notice to the effect that the recommendations of the Wild Flower Preservation Society as to the collection of any such materials have been scrupulously observed. This advice may be obtained from the Society at 3740 Oliver street, Washington 15, D. C.

Author's Note: A full account of the development of the above project entitled "The Local Flora Section (Native Wild Flower Garden) of the Brooklyn Botanic Garden," by Dr Henry K. Svenson, was published in the Botanic Garden Record as Guide No. 14, July 1942.

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The Land Otter

An Elusive Water Sprite Who Leads a Playful Life

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It was a peaceful morning in Parishville. Dishes done, the farmer's wife flipped her towel across the rack and stood in front of the big kitchen window, looking out at the trout stream that sparkled in the morning sun. Something white caught her eye and suddenly she realized that one of her big Pekin ducks was being dragged into a hole near the stream. Hastily pulling her boots on, she ran out just as the north end of the south-bound duck was disappearing into the opening. Nothing loath, she grabbed the duck's feet, braced her own and pulled. All she remembered after that was that something gave, then there was a crafty whiskered face and a long tapered body diving into the stream to be seen no more. That was Mrs McRobbie's introduction to the otter.

Your introduction probably will be from a much greater distance, for *Lutra canadensis* is pretty man-shy in the wild. In fact, you can put a gold star in your outdoor book of good behavior — or good luck — the day you even see an otter, for most people never do. What you will see, if you are lucky enough to catch one abroad in daytime, is a quick flash of something dark brown, lithe and graceful, just before it disappears. What you will have glimpsed is a thick-furred creature a little over a yard long, weighing about 20 pounds, with a flattened head, very short legs and webbed feet.

This very large representative of the weasel family is handsomely streamlined, resembling in contour a sleek air transport ship. Although this member of the family is known as the "land otter," he is seldom found far from the water, and for this aquatic life he has several excellent adaptations, one of which is a thick, warm coat of fur. In color, this is a rich, dark, lustrous brown; in durability, it is just about unbeatable, so much so that fur dealers grade all other pelts downward from the otter which stands for the mythical 100 per cent durability.

Among other adaptations for an aquatic life, the otter has a layer of fat over his body, well-webbed feet, close-set ears and a stout tapering tail, one-third his length, which helps achieve the serpentine movement that carries him swiftly through the water.

He is definitely striking in personality too, and seems at all times to be faintly amused. Whiskers embellishing a broad flat head add to his canny air of great mischief. A captive specimen will sit up like a prairie dog, hind legs and thick tail forming a tripod, and regard you from this position with paws drooping over his paunch, for all the world like a banker looking over a questionable loan prospect.

His favorite avocation is travel and he possesses more gaits than a circus horse. On one of his dry-land excursions to a favorite stream over the hill he may hump along like an inchworm, but give him a little snow and he travels fast with a run and a slide like a boy coming home from school on a slippery sidewalk. Water travel is his real speciality, however, and he has more tricks than an Olympic diver; in fact, he can do slow rolls through the water and other extraordinary aquatic feats. He delights in holes in the ice; and one otter played hide-and-seek with me for a week on a frozen stream, going from one stretch of open water down under the ice perhaps a quarter of a mile through alleys of dark mystery to the next opening, like a mouse in the vaults of a great cathedral.

His travel is apt to be rather devious, a strong nomadic urge taking the creature on a regular 50 to 60-mile beat which he may cover every couple of weeks. Somewhere along the line he may have a home; I have seen one living in a vacant beaver house, but he will be content with an abandoned burrow in the bank. Especially will a female take up housekeeping while caring for her two to four young, which may be born a year after mating occurs. She is a good mother, teaching her young to swim and making sure there is plenty of food for their hungry mouths.

Inedible parts of the food, such as crayfish shells, will be found, as will the scats, near the cabin door, for the otter is a neat housekeeper wherever his home. Most of the menu is mobile, probably about 60 per cent fish; the rest comprises mussels and other aquatic animals. The

Courtesy of Royal Ontario Museum of Zoology

A Mounted Land Otter, Showing the Webbed Feet Adapted to an Aquatic Life

fare is largely fish in winter but chiefly other items in summer. You will hear trout fishermen condemn the otter; but this could be jealousy. It should be admitted that he can deplete a good trout hole, but mostly his diet contains less than 25 per cent game fish. Certainly crayfish constitute an important item, as piles of shells along the bank will attest, and his teeth are well adapted for crunching them.

Even in his foraging he shows playful traits, frequently fishing just for fun. I know one pond where he caught dozens of stunted bullheads and threw them up on the bank, apparently for the sport of the thing. This penchant for sport is best manifested in otter slides. In summer several of them may hold a rendezvous at a steep bank for this activity, sliding down the grade on their bellies to end up with a dive into the water. If possibly they find the summer mud a little dull, it is in winter that they really enjoy the slides. I remember a mountain stream where a little series of waterfalls had frozen, providing them with a perfect roller-coaster. From the tracks in the snow, it appeared that they would slide down the 60-yard incline, paddling with their hind feet for added momentum; then cavort through the conifers back up the stream bank to the top to start the game anew. They love to roll in the grass and will pile leaves in the fall, perhaps to run and jump in as children do in the school yard in autumn.

The otter is certainly well equipped for a playful existence, having most of the prerequisites; he prefers the easy life and the complacent feeling induced by a full stomach — and his usually is. He spends his time as though he had a thousand lifetimes to live, does little but eat, sleep and play, and may mate with more than one female in a season, although he reserves most of his loyalty each year for one mate.

Although, like all weasels, he has a pugnacious strain, *Lutra* is not innately vicious; in fact, a keen observer named Liers has given them the run of his place for a quarter of a century and, according to him, about half of them have really congenial personalities and make affectionate pets.

But do not let Mr Liers' patient experimentation give you any undue fur-farming hopes, because raising otters requires a careful study of their diet, habits and many other complex factors. You would not enjoy seeing one in a cage anyway. Their pitiful attempt at play in trying to make a slide out of a concrete ramp would strain the heart of the most calloused zoo keeper.

In England, otters are the object of the chase with hounds which even take to the water and sometimes catch up with them, making the salmon fisherman very happy.

The otter is quite an international figure, all in all, and his keep-out-of-sight ability should insure his continued wide distribution. Protection has increased his numbers in parts of North America and representatives of this genus are to be found almost everywhere except in the very arid Southwest.

Otters are likely to turn up in the most unexpected places. For example, a Wisconsin man caught one on a set line in 42 feet of water. A Mr Gibbs of Schroon Lake was fishing through the ice for great northern pike, using a good-sized sucker for bait, when suddenly he got "the bite to end all bites" and minutes later hauled in the last of the line against something which seemed to have the strength of a recalcitrant heifer. Suddenly to his amazement a pair of paws appeared on the edge of the hole in the ice, a pair of malevolent eyes glared at him, and the otter spit out the hook, dove back into the hole and was gone.

The Moccasin-Flower

THE MOCCASIN-FLOWER or pink lady's-slipper (*Cypripedium acaule*) is one of the handsomest and most easily recognized flowers in New York State. It is our only plant with a flower appearing much like a large purplish pink pouch (1½ to 3 inches long and perhaps half as thick) on a naked stem above two or three rich blue-green leaves. The only other kinds of plants with similar pouches (the other lady's-slippers) have leafy stems or, in the case of the rare calypso or fairy-slipper, a single small leaf and a scooplike structure rather than a true pouch.

All these plants are part of the great family of orchids, which numbers several thousand species. Although primarily tropical, many species are known from temperate zones and a few have ranges extending north of the Arctic circle. Fifty-six species and races have been recorded from New York State. Of these, two may now be extinct or nearly so in our area: the small round-leaved orchid (*Orchis rotundifolia*) and the fairy-slipper (*Calypso bulbosa*).

The moccasin-flower blooms in late May and early June. A plant consists of one to many pairs of hairy, veiny and slightly pleated oblong leaves (several inches long), borne at the surface of the ground above a cluster of fleshy white roots. From the centers of many of these pairs of leaves arise naked flower stalks varying from a few inches to nearly two feet in height. Near the top of each stalk and just below the flower is a small leaflike bract. The flower consists primarily of an oblong ovary filled with tiny seeds, topped by the free parts of the sepals and the petals. The three greenish sepals appear to be two (the two lower are united) and there are two greenish-brown petals in addition to the third — the large inflated and veiny pouch. Although usually purplish pink, the pouch may sometimes be nearly rose-red or very pale; occasionally it is pure white. Inside this pouch are the two anthers and the stigma.

Fertilization is accomplished by bumblebees which force their way through the fissure extending the full length of the upper side of the pouch. The insect visitor pollinates the stigma first in his search for food, but in attempting to emerge he is attracted by the light coming through the pale thin area in the bottom of the sac and thus brushes against the anthers which bestow a fresh load of pollen. Many bees cut their way out of the bottom of the flower rather than try to find the way back to the entrance. The ovary ripens into an oblong seedpod in late summer. Remnants of these pods can still be seen borne nearly erect on the stiff dead stems the following winter and spring.

The range of this species extends from northern Alberta and Newfoundland south to Minnesota and Long Island, thence along the mountains to northern Georgia. It thus covers practically all New York State. It probably occurs somewhere in each of our 62 counties, having been definitely recorded from most of them, although it may now be extinct in some of the boroughs of New York City. It grows in acid woodland soils, frequently under pine trees and commonly in wet boggy woods northward. Common associates are blueberries and the pink azalea. The clumps of lady's-slipper are usually scattered and local. Rarely, one finds a wooded slope with dozens of thrifty plants — a sight never to be forgotten when the flowers are in full bloom. Along a few trails in the Adirondacks both white and pink-flowered plants are common.

The flowers are frequently picked by thoughtless persons. This destroys the possibility of development of seed for that season, and the flowers in a bouquet never have the beauty so remarkable in a woodland habitat. Many persons try to transplant the clumps, but most attempts do not succeed; if they do, the specimens rarely survive more than a few years. How much better to leave them where they occur naturally — to add to the joy of all who walk that way.

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